

G. 81680

Claims

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1. An optical cross connect comprising:
- a first plurality of input channels (I1, ..., IM) for transit data traffic,
 - a second plurality of output channels (O1, ..., OM) for transit data traffic,
 - 10 - a plurality of first optical switching fabrics (S1, ..., SN) comprising a first group of input ports (i1, i2, ..., iM) which are connected to input channels (I1, ..., IM) of the cross connect and a first group of output ports (o1, o2, ..., oM) which are connected to output channels (O1, ..., OM) of the cross connect, for interconnecting input and output channels,
 - 15 - a group of one or more signal shaping units (R; T1, ..., TQ; RX; SE, TX) formed as wavelength converters,
 - 20 - means (f, S') for connecting a second group of output ports (o1, o2, ..., oM) of the first optical switching fabrics (S1, ..., SN) to a respective input of a signal shaping unit of the group and means (f, S'') for connecting a second group (I'1, ..., I''P) of input ports of the first optical switching fabrics (S1, ..., SN) with a re-
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spective output of one of said signal
shaping units,

5 characterized in that each of said first
switching fabrics (S1, ..., SN) is provided for
switching communication signals at a same
wavelength assigned to said first switching
fabric, and that the connecting means (S', f;
S', S'') are adapted to connect the input and
10 the output of a wavelength converter (T1, ...,
TQ) with different first switching fabrics
(S1, ..., SN).

2. The optical cross connect of claim 1, charac-
terized in that the connecting means comprise
15 wired lines (f) between an output or input of
the signal shaping unit and an input port or
output port (i'1, ..., i'P; o'1, ..., o'P), re-
spectively, of the first switching fabrics
(S1, ..., SN).

3. The cross connect of claim 1 or 2, character-
20 ized in that the connecting means comprise
switching elements (S', S'') for selectively
connecting an output or an input of a signal
shaping unit to one of several input or out-
put ports, respectively, of the first switch-
25 ing fabrics.

4. The optical cross connect according to one of
the preceding claims, characterized in that
each signal shaping unit (R, T1, ..., TQ) is
adapted to shape an individual communication
30 signal.

5. The optical cross connect according to one of the preceding claims, characterized in that the connecting means comprise at least one second switching fabric (S') which selectively connects the second group output ports (o'1, ..., o'P) of the first switching fabrics (S1, ..., SN) to one of the wavelength converters (T1, ..., TQ).
6. The optical cross connect according to one of the preceding claims, characterized in that the connecting means comprise at least a third switching fabric (S'') which selectively connects the wavelength converters (T1, ..., TQ) to one of the second group input ports (i'1, ..., i'P) of the first switching fabrics (S1, ..., SN).
7. The optical cross connect according to one of the preceding claims, characterized in that each input channel (I1, ..., IM) is connected to the first switching fabrics (S1, ..., SN) via a wavelength demultiplexer (D1, ..., DM) and/or the first switching fabrics (S1, ..., SN) are connected to each output channel (O1, ..., OM) via a wavelength multiplexer (M1, ..., MM).
8. The optical cross connect according to one of the preceding claims, characterized in that it comprises inputs and/or outputs (IM, OM) for branching data traffic and means (f, SE) for connecting these inputs or outputs to

second group input or output ports ($i'1, \dots, i'P$; $o'1, \dots, o'P$) of the first switching fabrics ($S1, \dots, SN$).

- 5 9. The optical cross connect according to one of the preceding claims, characterized in that the wavelength converters ($T1, \dots, TQ$) each have a wavelength-tuneable transmitter part.
- 10 10. The optical cross connect according to one of the preceding claims, characterized in that the first group input ports ($i1, \dots, iM$) are connected to the input channels ($I1, \dots, IM$) and/or the first group output ports ($o1, \dots, oM$) are connected to the output channels ($O1, \dots, OM$), respectively, without a switching fabric inserted in between.
- 15 11. A method for switching a communication signal in an optical cross connect, in particular in an optical cross connect according to one of the preceding claims, the cross connect comprising a plurality of switching fabrics ($S1, \dots, SN$) connected in parallel between a plurality of input channels and a plurality of output channels, each of the switching fabrics being provided for switching communication signals of a same wavelength assigned to it, comprising the steps of:
 - 20 a) receiving the communication signal by an input channel ($I1, \dots, IM$) of the cross connect,
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- b) assigning an output channel (O1, ..., OM) to the communication signal,
- c) deciding whether a wavelength conversion of the communication signal has to be carried out,
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- d) inputting the communication signal into a switching fabric (S1, ..., SN) assigned to its wavelength,
- e) if a wavelength conversion was found necessary in step c):
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 - e1) outputting the signal at an output port (o'1, ..., o'P) of the switching fabric (S1, ..., SN) which is connected to a wavelength converter (T1, ..., TQ),
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 - e2) carrying out the wavelength conversion,
 - e3) inputting the communication signal into another switching fabric from the plurality of parallel switching fabrics (S1, ..., SN), to which the converted wavelength of the communication signal is assigned,
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- f) outputting the communication signal from the switching fabric (S1, ..., SN) to the output channel (O1, ..., OM) assigned to it.
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